

## 1.12 I-526 DHVs

**Table 11** and **Table 12** show the existing and projected future 2030 and 2050 DHVs for I-526, east of Long Point Road at ATR 90. The future DHVs were estimated using the growth factors presented in the Growth Rate section of this technical memorandum. The PM peak hour DHV was the 30<sup>th</sup> highest hour in 2019, which was Thursday October 3. The AM peak hour peak hour DHV was the 146<sup>th</sup> highest hour in 2019, which was Monday September 9.

**Table 11: I-526 AM Peak Hour DHV Mainline Directional Volumes**

| AM Peak Hour 7:00 to 8:00 AM |           |           |       |
|------------------------------|-----------|-----------|-------|
| YEAR                         | Eastbound | Westbound | Total |
| 2022                         | 2,587     | 2,783     | 5,370 |
| 2030                         | 2,950     | 3,170     | 6,120 |
| 2050                         | 4,040     | 4,340     | 8,380 |

**Table 12: I-526 PM Peak Hour DHV Mainline Directional Volumes**

| PM Peak Hour 5:00 to 6:00 PM |           |           |       |
|------------------------------|-----------|-----------|-------|
| YEAR                         | Eastbound | Westbound | Total |
| 2022                         | 3,386     | 2,364     | 5,750 |
| 2030                         | 3,860     | 2,690     | 6,550 |
| 2050                         | 5,280     | 3,690     | 8,970 |

### 1.12.1 Interchange DHV Factors

February 2022 traffic volumes along Long Point Road and Seven Farms Drive were converted to DHVs using the discussed COVID-19 factor and factors developed to estimate the 30th highest hour (PM peak) and 146th highest hour (AM peak). **Table 13** display the equivalent dates in February 2019 to compare average total I-526 traffic volumes to the 30th and 146th highest hour of ATR 90. A 5% factor was determined to increase the February counts to be as high as an October count pre-COVID. These 2022 total intersection volumes were independently compared to the original, unfactored 2017 TMC of the study intersections included in the 2017 LLC I-526 EAST PEL study. In all cases, the total hourly entering intersection volume was lower in 2022 than the previous approved turning movement volume totals based on 2017 counts as shown in Table 13. The yellow highlighted value indicates the larger total volume.

|              | AM  | PM |
|--------------|-----|----|
| COVID Factor | 10% | 0% |
| DHV Factor   | 5%  | 5% |

**Table 13: Equivalent February 2019 compared to Design Hour Volumes**

| 2019              |                    | 2019               |                    |
|-------------------|--------------------|--------------------|--------------------|
| Equivalent Dates  | 5 6 PM 2 Way Count | Equivalent Dates   | 7-8 AM 2-Way Count |
| 6-Feb             | 5,541              | 6-Feb              | 5,089              |
| 26-Feb            | 5,469              | 26-Feb             | 5,060              |
| 27-Feb            | 5,389              | 27-Feb             | 5,182              |
| <b>Average</b>    | <b>5,466</b>       | <b>Average</b>     | <b>5,110</b>       |
| DHVfactor         | 1.05               | DHVfactor          | 1.05               |
| 30th Highest Hour |                    | 146th Highest Hour |                    |
| 10/3/2019         | 5,750              | 9/9/2019           | 5,370              |

Table 14: 2022 Factored DHV vs. 2017 Unfactored TMC at Long Point Road and Daniel Island Interchanges

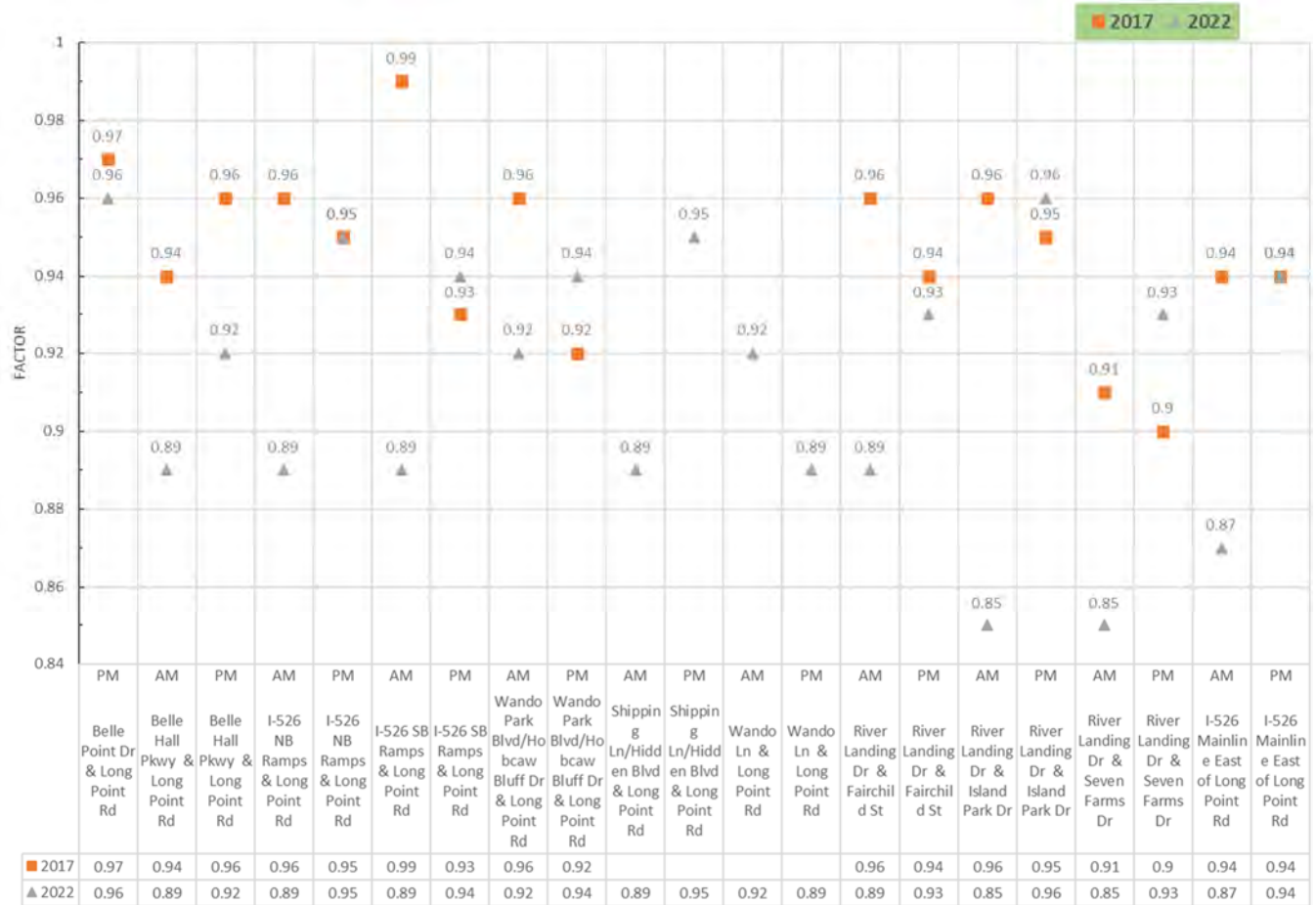
| Long Point Road Intersection at:     | Time Period    | Data Set              | Hourly Totals | Amount less |
|--------------------------------------|----------------|-----------------------|---------------|-------------|
| Belle Point Dr                       | 07:00-08:00 AM | 2022 DHV with factors | 3046          | 97%         |
|                                      |                | 2017 TMC unfactored   | 3126          |             |
| Belle Point Dr                       | 05:00-06:00 PM | 2022 DHV with factors | 3209          | 91%         |
|                                      |                | 2017 TMC unfactored   | 3515          |             |
| Belle Hall Pkwy                      | 07:00-08:00 AM | 2022 DHV with factors | 3258          | 98%         |
|                                      |                | 2017 TMC unfactored   | 3320          |             |
| Belle Hall Pkwy                      | 05:00-06:00 PM | 2022 DHV with factors | 3456          | 90%         |
|                                      |                | 2017 TMC unfactored   | 3831          |             |
| I-526 NB Ramps                       | 07:00-08:00 AM | 2022 DHV with factors | 3958          | 97%         |
|                                      |                | 2017 TMC unfactored   | 4094          |             |
| I-526 NB Ramps                       | 05:00-06:00 PM | 2022 DHV with factors | 4134          | 94%         |
|                                      |                | 2017 TMC unfactored   | 4378          |             |
| I-526 SB Ramps                       | 07:00-08:00 AM | 2022 DHV with factors | 3266          | 98%         |
|                                      |                | 2017 TMC unfactored   | 3325          |             |
| I-526 SB Ramps                       | 05:00-06:00 PM | 2022 DHV with factors | 3576          | 91%         |
|                                      |                | 2017 TMC unfactored   | 3948          |             |
| Wando Park Blvd/Hobcaw Bluff Dr      | 07:00-08:00 AM | 2022 DHV with factors | 2078          | 99%         |
|                                      |                | 2017 TMC unfactored   | 2108          |             |
| Wando Park Blvd/Hobcaw Bluff Dr      | 05:00-06:00 PM | 2022 DHV with factors | 2185          | 88%         |
|                                      |                | 2017 TMC unfactored   | 2487          |             |
| Shipping Ln/Hidden Blvd              | 07:00-08:00 AM | 2022 DHV with factors | 1192          | 0%          |
|                                      |                | 2017 TMC unfactored   | 0             |             |
| Shipping Ln/Hidden Blvd              | 05:00-06:00 PM | 2022 DHV with factors | 1161          | 0%          |
|                                      |                | 2017 TMC unfactored   | 0             |             |
| Wando Ln                             | 07:00-08:00 AM | 2022 DHV with factors | 671           | 0%          |
|                                      |                | 2017 TMC unfactored   | 0             |             |
| Wando Ln                             | 05:00-06:00 PM | 2022 DHV with factors | 560           | 0%          |
|                                      |                | 2017 TMC unfactored   | 0             |             |
| River Landing Drive Intersection at: | Time Period    | Data Set              | Hourly Totals | Amount less |
| Fairchild St                         | 07:00-08:00 AM | 2022 DHV with factors | 1796          | 84%         |
|                                      |                | 2017 TMC unfactored   | 2133          |             |
| Fairchild St                         | 05:00-06:00 PM | 2022 DHV with factors | 1412          | 71%         |
|                                      |                | 2017 TMC unfactored   | 1984          |             |
| Island Park Dr                       | 07:00-08:00 AM | 2022 DHV with factors | 1311          | 87%         |
|                                      |                | 2017 TMC unfactored   | 1509          |             |
| Island Park Dr                       | 05:00-06:00 PM | 2022 DHV with factors | 1112          | 74%         |
|                                      |                | 2017 TMC unfactored   | 1493          |             |
| Seven Farms Dr                       | 07:00-08:00 AM | 2022 DHV with factors | 1857          | 94%         |
|                                      |                | 2017 TMC unfactored   | 1968          |             |
| Seven Farms Dr                       | 05:00-06:00 PM | 2022 DHV with factors | 1820          | 95%         |
|                                      |                | 2017 TMC unfactored   | 1906          |             |

A review of the individual turning movements measured in 2022 indicated that some changes have occurred that yielded a higher vehicle count in 2022 than the previous 2017 data set. These changes were attributed to a new Chick-fil-A restaurant on Belle Point Drive and housing occupancy increases in the area. Resulting calculations displaying the locations where 2022 turning movement volumes were used with the 2017 previously approved data set are included in the **APPENDIX**.

### 1.12.2 Peak Hour Factors

A comparison of peak hour factors (PHF) between 2017 and 2022 turning movements were conducted. In most cases, the 2017 PHF was higher or equal to the 2022 measures PHF. **Figure 18** shows a display of the PHFs by intersection location.

Figure 18: Peak Hour Factor Comparison - 2017 vs. 2022



## 2.0 SUMMARY AND RECOMMENDATIONS

This Design Hour Volume technical memorandum has presented a methodology to independently develop factors to apply to the 2022 traffic data to the 30th highest hour of a typical year pre-COVID-19 operation using best practices to compare the previously accepted and approved 2017 traffic data used in the 2017 I-526 LCC EAST PEL study. Despite best efforts, 2022 design hour volumes on Long Point Road and Seven Farms Drive interchanges and intersections are less than 2017 design hour volumes. Long Point Road and Seven Farms interchanges are not demonstrating the same characteristics as I-526 mainline. The impact of COVID-19 on I-526 continues to occur in the AM peak but not as noticeable in the PM peak hour. A conclusion was determined that the 2022 volumes, even factored, are smaller than the 2017 DHV's. A recommendation of this design hour volume technical memorandum to develop 2022 DHVs is to:

- Use 2017 LCC DHVs with a few modifications of higher 2022 DHVs
- Use growth rate as per LCC EAST PEL analysis output
  - 1.6% annual growth on I-526 freeway and ramps
  - 1.0% on Long Point Rd north of I-526
  - 1.2% on Long Point Rd south of I-526
- Adopt design years
  - 2022,
  - 2030, and
  - 2050
- Use 2017 truck percentages for Long Point Road but increase based on Wando Port growth projections provided
- Use 2017 PHFs

## 2.1 2022 DHVs

**Figure 19** displays the 2022 design hour volume traffic volumes for the Seven Farms Drive interchange and intersections. **Figure 20** displays the 2022 design hour volumes for the Long Point Road interchange and intersections. **Figure 21** displays the 2022 design hour volume traffic volumes for the Hungryneck Boulevard interchange.

As a final check of the proposed 2022 Long Point Road ramp DHVs, an analysis of K-factors (DHV/2018 AADT) was undertaken with the expectation that they should generally be between 0.08 and 0.11. All the 2022 K-factors were within the anticipated range except:

- The northwest quadrant on-ramp from Long Point Road to westbound I-526 where the AM peak hour K-factor is 0.19. The 2018 AADT was 7,700 vpd.
- The southeast quadrant loop on-ramp from Long Point Road to westbound I-526 where the AM peak hour K-factor is 0.07 and the PM K-factor is 0.06. The 2018 AADT was 7,500 vpd.
- The on-slip ramp from Long Point Road to eastbound I-526 where the AM peak hour K-factor is 0.06. The 2018 AADT was 4,600 vpd.

Each of these links facilitate one-way movements which often fall outside the standard 0.08 to 0.11 range that is typical for a bidirectional roadway. Reasons can include an offsetting opposite movement at a different ramp that has a high directional pairing with the subject ramp. Although somewhat lower than typical, the 0.06 and 0.07 K-factors were judged acceptable. The 0.19 K-factor required more investigation. In 2017, the on-ramp from Long Point Road to westbound I-526 had a measured AM peak hour volume of 1,231 vph, producing a K-factor of 0.16. The value of 1,231 vph was converted to a 2017 DHV of 1,385 vph with balancing and smoothing techniques applied, resulting in a K-factor of 0.18. From this analysis, it was concluded that the 2022 DHV is reasonable because of either a large surge of AM peak hour traffic or a low AADT.

## 2.2 2030 DHVs, TRUCK, TOTAL

Traffic volumes in 2022 were grown with compounded growth rates based on the CHATs TDM to develop 2030 traffic volumes. **Figure 22** displays the 2030 DHV's for the Seven Farms Drive interchange and intersections. **Figure 23** displays the 2030 DHV's for the Long Point Road interchange and intersections. The Long Point Road Interchange is unique because of the substantial number of tractor trailer trucks compared to single unit trucks. Growth of the Wando Port terminal will be incorporated into 2030 Long Point Road DHVs. The additional tractor trailer truck trips as shown in **Figures 24 and 25** for the I-526 mainline and Long Point Road, respectively, reflecting more growth at WWT than from the TDM, were added to the "base" DHVs in Figures 21 and 22. **Figures 26, 27 and 28** display the 2030 DHV's including tractor trailer trucks for Seven Farms Drive, Long Point Road, and Hungryneck Boulevard interchanges, respectively.

## 2.3 2050 DHVs, TRUCK, TOTAL

Traffic volumes in 2022 were grown with compounded growth rates based on the CHATs TDM to develop 2050 traffic volumes. **Figure 29** displays the 2050 DHV's for the Seven Farms Drive interchange and intersections. **Figure 30** displays the 2050 DHV's for the Long Point Road interchange and intersections. Growth of Wando Port will be incorporated into 2050 Long Point Road DHVs. The additional tractor trailer truck trips as shown in **Figures 31 and 32** for the I-526 mainline and Long Point Road, respectively, reflecting more growth at WWT than from the TDM, were added to the "base" DHVs in Figures 27 and 28. **Figures 33, 34 and 35** display the 2050 DHV volumes including tractor trailer trucks for Seven Farms Drive, Long Point Road, and Hungryneck Boulevard interchanges, respectively.

Figure 19: Seven Farms Dr. Interchange 2022 Design Hour Traffic Volumes

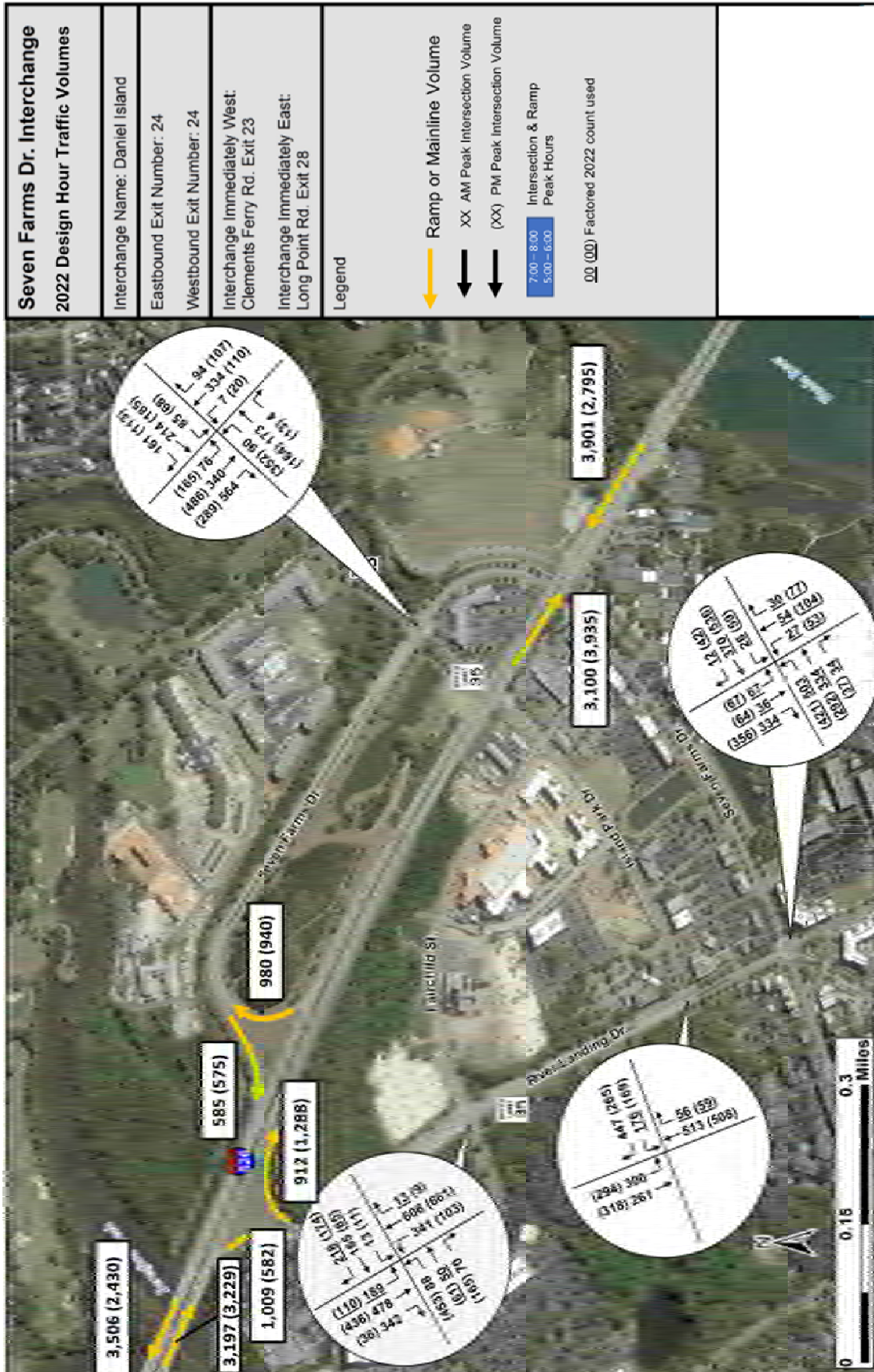


Figure 20: Long Point Rd. Interchange 2022 Design Hour Traffic Volumes

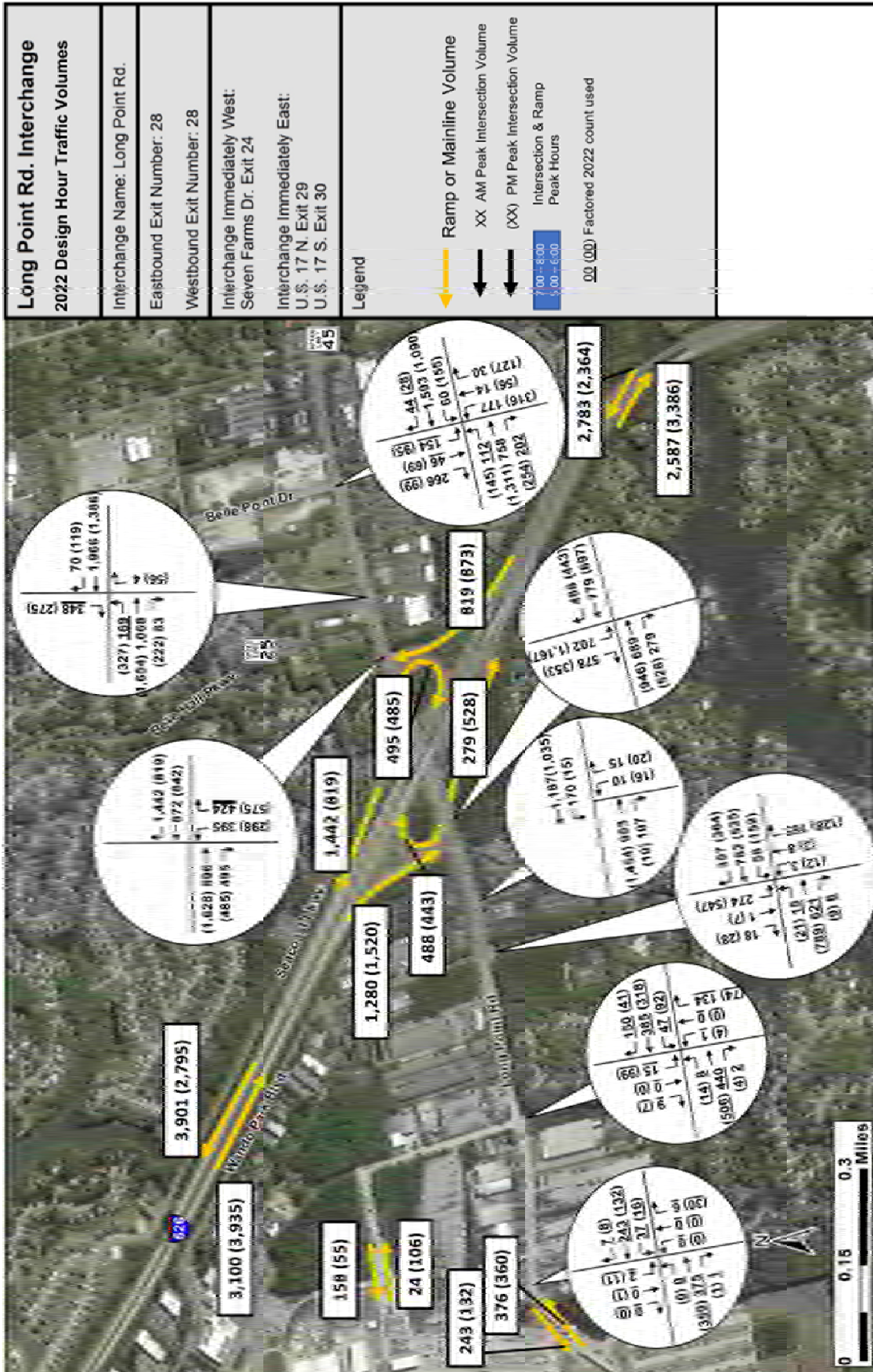


Figure 21: Hungryneck Blvd. Interchange 2022 Design Hour Traffic Volumes

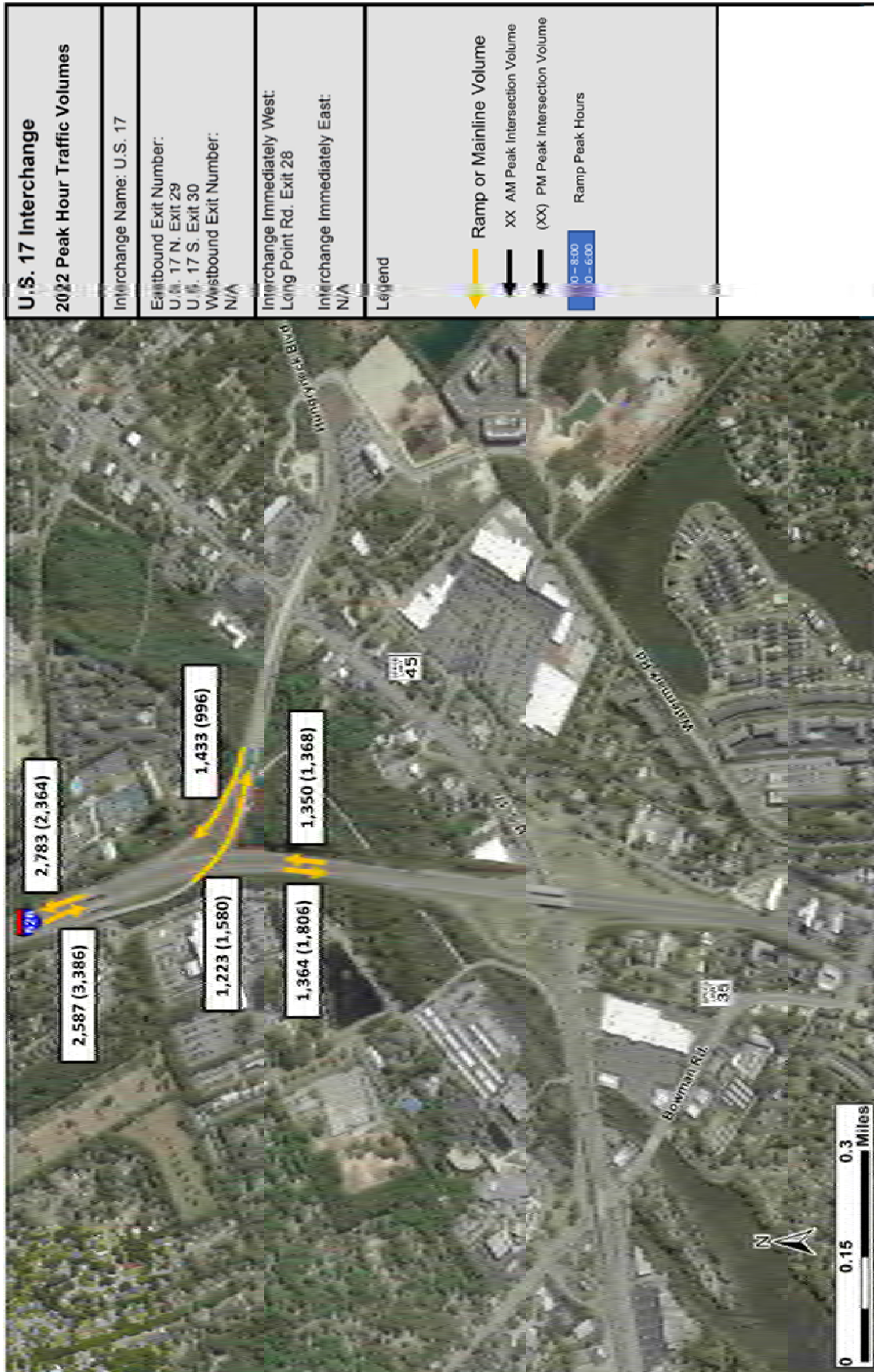




Figure 22: Seven Farms Dr. Interchange 2030 Design Hour Traffic Volumes

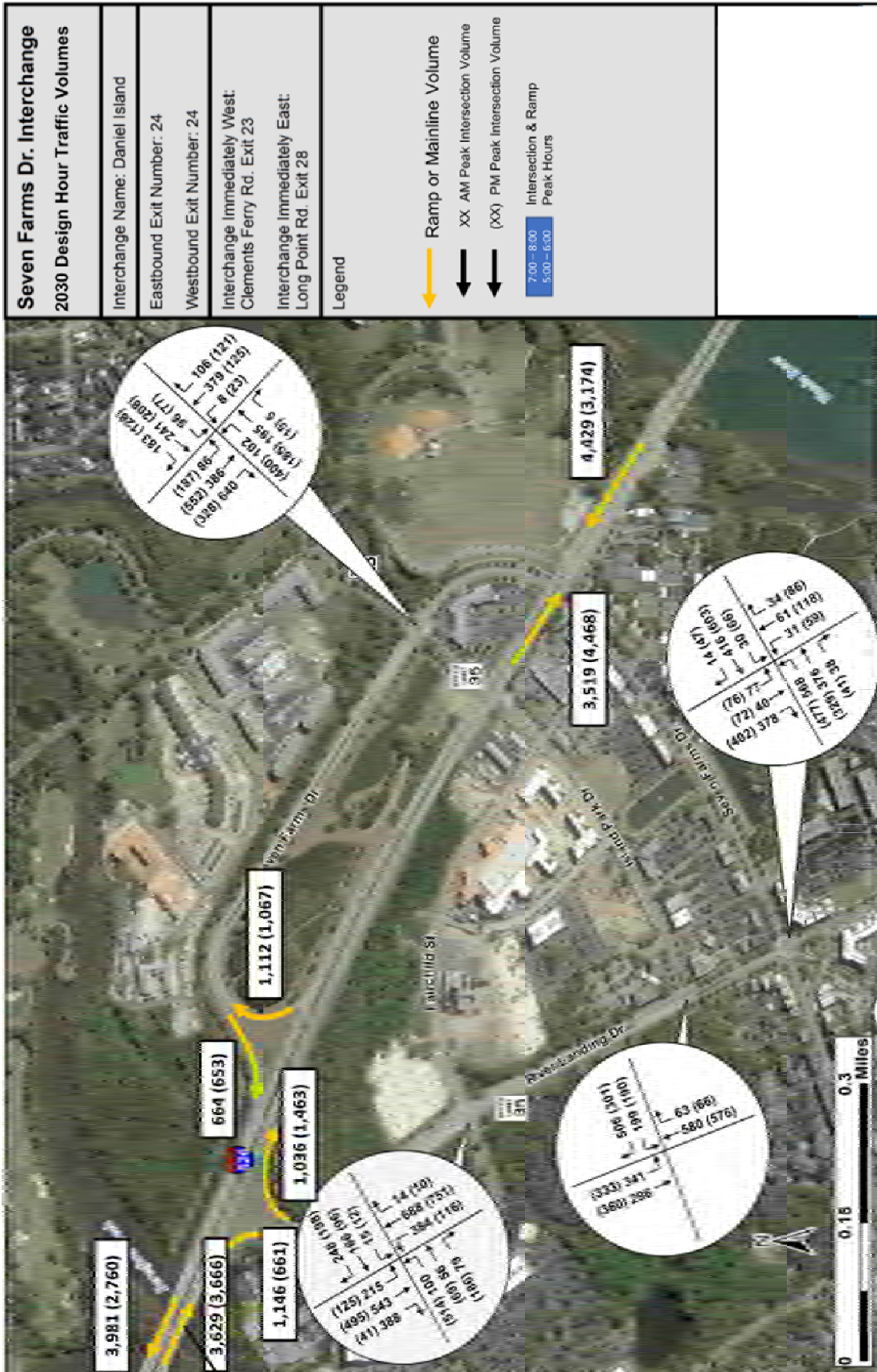


Figure 23: Long Point Rd. Interchange 2030 Design Hour Traffic Volumes

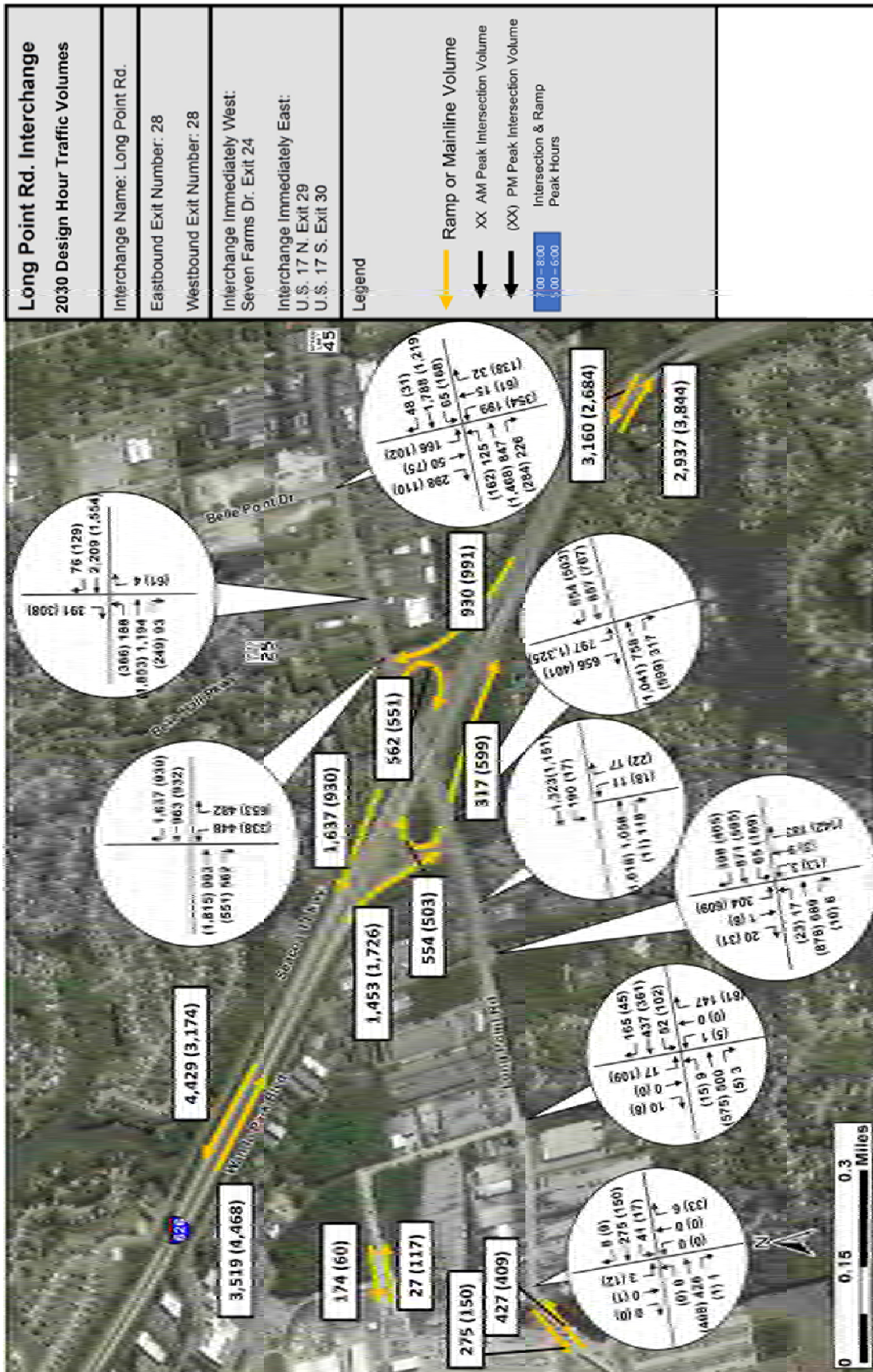


Figure 24: Seven Farms Dr. Interchange 2030 Tractor Trailer Trucks Only Volumes

